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25X1

October 14, 1959

PROGRESS REPORT

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TASK III

All of the parts, with the exception of castings, have been fabricated. Difficulties encountered in the procurement of satisfactory castings have delayed us approximately three weeks, but the units received recently are sound. A number of these are undergoing completion at present.

The first camera is being assembled, and progress so far has been quite satisfactory. The entire front end including shutter, shutter control and drive is complete. The entire assembly will be tested with the amplifier next week.

According to our present schedule, the first camera will be completely assembled by November 15, 1959.

Minor engineering modifications are being incorporated in the design based on experience gained with Task X. One of the items being added is a telltale on each of the magazines of the system.

As a result of a meeting held with the customer's representative, it was decided to include a low-light-level cutoff switch. On the other hand, the switch to limit camera operation to speeds of 1/50 or over, has been abandoned in order to avoid additional complications.

With respect to the low-light-level switch, a new solution to this problem is being contemplated. As previously envisioned, the low-light-level switch would shut down the camera when the subject lighting is two stops below normal. This results in a savings in film and camera power drain during night hours. The amplifier, however, continues to absorb 2 ma each hour during the night.

Under remote manual operation or when an optical sensor is used, the operator, or sensor, prevents wasted film and camera power drain. With a seismic sensor or intervalometer, the camera would presumably work through the night if it were not for a low-light-level switch.

The above approach is valid but does not go far enough because it neglects the power drain imposed by the exposure control amplifier. Even though this drain is small in magnitude, it is "on" constantly. As a result, it is probable that the amplifier drain will be greater than the camera drain for missions which last two weeks or longer.

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October 14, 1959

PROGRESS REPORT (cont'd)TASK III (cont'd)

As an example, assume that a 1000 ft. of film are used up in a 30 day period of unattended operation. It takes 100 minutes to use up the film at 2 frames per second. At 100 milliamperes, the total power drain is

$$\frac{100}{60} (100) = 166 \text{ milliampere hours.}$$

On the other hand, the amplifier drain is 2 milliamperes. Over a 24 hour period the drain is 48 milliampere hours. Over a 30 day period, the power drain is 1440 milliampere hours.

It is obvious then that it is potentially possible to save half of the 1440 milliampere hours if the amplifier could be shut down during the night time. The savings can be more than 4 times what the camera proper consumes in exposing a 1000 foot roll of film!

The approach under consideration will cause the entire camera to shut off under low light conditions. The savings in power drain makes it possible to reduce the requirements on the power pack and charger.

Further design information relating to the low-light-level switch as well as recommended power pack capacities will be forwarded as soon as further investigation permits.

TASK IX

All work on this task was suspended and no progress was made in the previous report period. Approval to proceed with fabrication was received verbally this week and final design work is now underway.

TASK X

Engineering modifications are now being incorporated to the camera design in accordance with the results gained in field testing. These modifications are scheduled for completion within the next two weeks.

Among the more important elements being considered are modifications to the shutter in order to reduce wear and noise and improved shutter spring design.

(Continued)

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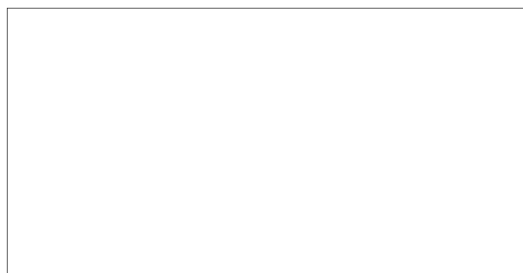
October 14, 1959

PROGRESS REPORT (cont'd)

TASK X (cont'd)

The carrying cases to be provided will be fabricated in accordance with requirements to be supplied by the customer.

Fabrication of the remainder of this order will proceed as soon as the initial unit of Task III is completed.



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August 13, 1959

Memo to [REDACTED]

From [REDACTED]

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Subject: Progress Status of Task #III

The completion of the first item on Task #10 has permitted the renewed concentration on Task #III. Approximately half the parts are completed and a good portion of the remainder is now in the works. At the present rate, assembly of this camera can begin early in September.

The design of the exposure control amplifier is now complete and initial tests indicate that the unit is efficient, reliable and sensitive. The accuracy obtained with it is in the order of one quarter stop and the quiescent current drain 2.4 milliamperes. This represents a considerable improvement over the earlier prototype. During the adjustment phase of automatic exposure control, the current drain increases to 37.4 ma.

The amplifier has yet to be tested under varying temperature conditions to check its stability. This phase of the work will be accomplished within a weeks time.

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DEPARTMENT OF DEFENSE
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April 23, 1959

Registered Mail

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Subject: Progress Status Contract RD-113
Tasks III, V, VII, IX, X

Gentlemen:

With respect to the above mentioned tasks, the attached report represents the progress made in the thirty day period preceding this report.

Very truly yours,

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AE:aw

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April 23, 1959

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TASK III

All major design tasks involving the camera and magazine are complete. Engineering effort is now being directed toward solving minor details such as control locations, cam profiles and reflex housing adapters. No engineering problems are anticipated in the remainder of the program.

Fabrication is proceeding according to schedule. A great many of the parts are in various stages of completion. In some of the magazines, fabrication is about 75% complete.

Our present schedule calls for completion of fabrication and assembly by the end of July 1959.

TASK V

After considerable effort we have finally been able to place an order for the apparatus to enable us to evaluate the grain integration program. The design of the apparatus was approved by us a week ago and delivery of the completed item is expected within ten days.

It should take no longer than thirty days after the apparatus is adjusted and ready for use to complete reading the test exposure, and for evaluation of same.

TASK VII

The limited success in silencing the Robot Camera warrants a reappraisal of the entire program. Apparently, it is not going to be possible to optimize both the silencing and the desired high degree of reliability. A high degree of performance in one of these cannot be brought without sacrificing a little of the other.

In view of the above, we recommend that an electric motor drive be considered in place of the spring motor. This approach will most certainly achieve a high degree of silent operation and at the same time make for a more reliable unit.

TASK IX

Further effort is being directed toward solving of the optical system as reported earlier. According to recent indications, our designer should have this task completed early in May. In the meantime, receipt of preliminary information is expected very shortly which will enable us to launch the mechanical design of the camera.

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An overall delivery date will be established as soon as the optical specifications are tied down.

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April 23, 1959

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TASK X

Although the change in the arrangement of sensors inside the camera to an external location has caused us some delays, we are still proceeding rapidly with the various phases of this program. The only major design problems remaining pertain to the electrical control system and the associated components.

Fabrication of parts is proceeding steadily, with at least 75% of the magazine parts completed. An unexpected delay has presented itself with respect to procurement of patterns and castings. Our suppliers have not been able to give the same deliveries as we had been accustomed to receiving earlier this year.

Due to the above reasons, our delivery schedule has had to be readjusted. Completion of the first unit is expected before the end of June 1959.

There are no major engineering or fabrication problems which will affect this program other than that mentioned above.

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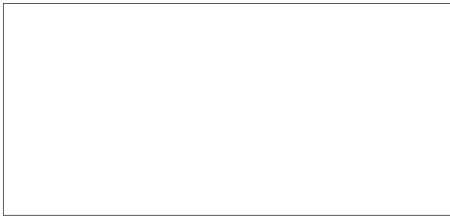
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Registered Mail

March 20, 1959



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**Subject: Progress Status Contract RD-113
Tasks III, V, VII, IX, X**

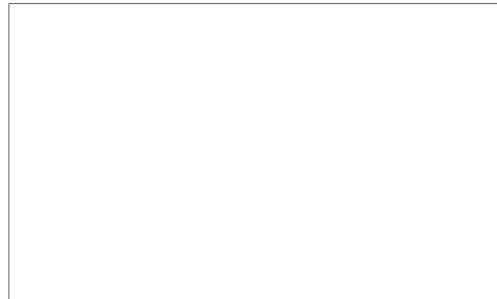
Gentlemen:

With respect to the above mentioned tasks, the attached report represents the progress made in the thirty day period preceding this report.

Very truly yours,

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March 20, 1959

TASK III

Further simplification of the automatic exposure control system was accomplished. This simplification has resulted not only in reduced fabrication costs, but also in increased reliability.

All other mechanical systems are now completely redesigned. The only major items remaining to be completed design-wise are the electronic amplifier and electrical circuitry.

A good deal of the parts going into the camera proper are about ready for release to fabrication. Those items requiring long delivery have already been released for fabrication.

With respect to the magazines, most of the parts have been released for fabrication and quite a few have been completed as of this date.

A mock up of the data recording system was constructed during this report period and is now undergoing tests. Initial results indicate that the problem is well on the way of being solved successfully.

Present progress indicates that we may expect a camera plus one magazine to be ready for testing by the end of June 1959. This date represents a deliberate four week extension of our initial schedule in order to make it possible to speed up Task X. (Ref. telecon of March 5, 1959). 25X1

TASK V

The read-out system for determining the effectiveness of the grain integration principle has been tentatively set and the necessary optics are on order. As soon as the design is proven out in the mock up, the entire setup will go into fabrication. We hope to have the completed unit ready within approximately four weeks.

TASK VII

The minor changes that have been requested have been incorporated into the camera. All that remains to be done is the engraving of several labels to identify operating parts of the camera.

A comparison check was made to compare the noise level of the prototype with a sample camera supplied by your organization. The results of the test indicate that the prototype has a slight advantage over the sample unit as far as noise level goes but that in terms of duration of noise, it is far superior. The test results will be submitted with the prototype in a few days.

March 20, 1959

TASK IX

Due to pressures from other assignments, our lens designer has been unable to provide us with an optical system as per his earlier promise. In the meantime, we have thought it prudent not to proceed with the mechanical system until the effectiveness of the optical system was verified.

As soon as we have the optical solution, we can safely proceed with the remainder of the program. At this time we shall prepare a realistic schedule for delivery of the unit.

TASK X

As a result of a telecon with [] on March 5, 1959, work on this program was speeded up at the expense of Task III. Delivery of a prototype should be approximately on May 29, 1959.

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As of this date, mechanical design of the system is approximately 90% complete. The incomplete portions of the task involve the accessories such as the lens reflex housing, which is to be modified, and the lens support.

The electronic and control circuitry is partially designed and this phase of the program represents the major engineering effort still to be expended.

Approximately 80% of the engineering work is now complete.

A considerable amount of effort is now going into the task of detailing and checking all parts for fabrication. All the parts which have not as yet been released for fabrication will be ready for release within two weeks.

A suitable tripod for this camera is now being investigated by us. We are confident that this piece of gear will be satisfactory for its intended use, once a special locking device is added.

CONFIDENTIAL

February 17, 1959

Memo. to [redacted] from
[redacted]

Subject: Progress Status of Tasks 3 & 9

TASK #3

Since the submission of the previous report, it has been possible to solve the problem relating to the lens mount. The approach using the Practina bayonet lens mount is now feasible because of a new type of lens focussing hood being manufactured by Leitz. This lens hood is sufficiently thinner to make it possible to maintain the needed clearance in the camera housing and at the same time to incorporate the Practina bayonet.

The entire exposure control system has been redesigned and refined to the point where a working prototype can be constructed. The new device does away with intermittent movements, which was the chief cause of noise in the earlier camera.

The shutter, too, is now simplified and effectively silenced. Speeds to be attained are as follows:

1/5, 1/10, 1/25, 1/50, 1/100, 1/200, 1/400 sec.

The shutter drive spring has been eliminated and replaced by a direct drive.

The data recording system has been solved and the design layouts are nearing completion.

The only remaining work at the present time concerns itself with the packaging of the amplifier and the electrical controls.

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Page 2

February 17, 1959

Fabrication of magazine parts has been steadily increasing. At the present rate of production, assembly work can begin in April.

TASK #9

Our optical designer has completed the initial study pertaining to the lens system for this task. The long focal length system worked out satisfactorily. However, on the short focal length system there is insufficient image quality to make it acceptable. It is now a matter of re-designing the long system in order to make the common lens elements more suitable to a satisfactory solution of the shorter system.

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Registered Mail

July 18, 1958

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Reference: RD-113, Task 3

Subject: Status Report

Gentlemen:

As you are probably well aware, the prototype system is presently in the process of evaluation and test by your organization. The protracted nature of these tests are now referenced only to the existing contractual schedule which called for completion of five (5) additional units by July 31, 1958. This date was however based upon so many months after approval of prototype.

Not wishing to contribute to a delinquent status, we merely take this opportunity to inform you of this status.

Further scheduling will of course be required subsequent to the time of final testing of the prototype. We shall inform you at the earliest moment.

Sincerely yours,

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HRG:aw

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DECEMBER 17, 1958

MEMO TO

FROM

CONFIDENTIAL

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SUBJECT: PROGRESS STATUS OF TASKS 3, 5, 7, AND 9

TASK #3

PRR.

A STUDY HAS BEEN CONDUCTED TO ASCERTAIN THE SUITABILITY OF SEVERAL TYPES OF COMMERCIAL BAYONET LENS MOUNTS. THE OBJECT OF THIS STUDY WAS TO FIND A SYSTEM WHICH ALLOWED THE USE OF A FOCUSING HOOD AND SHORT BARREL LEICA LENSES WITHIN THE DIMENSIONAL LIMITATIONS IMPOSED BY THE MECHANISMS IN THE FRONT END OF THE CAMERA. THUS FAR, THE EXACTA, PRACTINA AND MIRANDA BAYONET MOUNTS HAVE BEEN CONSIDERED.

A SECONDARY OBJECTIVE WAS TO ARRIVE AT A SOLUTION WHICH ALLOWED THE USE OF A STANDARD SHORT FOCAL LENGTH LENS AVAILABLE FOR ONE OF THESE COMMERCIAL CAMERA SYSTEMS.

OF THE THREE SYSTEMS, ONLY THE EXACTA SYSTEM SATISFIES ALL OF THE CONDITIONS ENUMERATED ABOVE.

7. EARLIER OBJECTIONS TO THE EXACTA MOUNT MAY BE OVERCOME BY THE SELECTIVE CHOICE OF MOUNTS AND LENSES AND BY THE USE OF STAINLESS STEEL IN THE FABRICATION OF ADAPTERS.

FURTHER WORK HAS BEEN DONE IN THE SIMPLIFICATION OF THE CAMERA FRONT END, AND PROGRESS IN THIS AREA IS QUITE SATISFACTORY.

TASK #5

THE TEST NEGATIVES MENTIONED IN THE PREVIOUS REPORT HAVE BEEN READ IN PAIRS. THE SET UP WHICH IS NECESSARY FOR READING THE NEGATIVES IN MULTIPLES OF THREE AND FOUR IS STILL UNDERGOING FABRICATION.

TASK #7

ASSEMBLY OF THIS CAMERA WAS COMPLETED SEVERAL DAYS AGO. IN THE PRESENT PHASE, THE UNIT IS UNDERGOING VARIOUS ADJUSTMENTS FOR THE PURPOSE OF MAXIMIZING PERFORMANCE. THE PROBLEMS ENCOUNTERED THUS FAR CONCERN THEMSELVES WITH NOISE REDUCTION AND GOVERNOR CONTROL.

TASK #9

THE DESIGN OF THE SPECIAL OPTICS REQUIRED FOR THIS TASK IS IN THE HANDS OF OUR LENS DESIGNER. SATISFACTORY PROGRESS IS BEING MADE IN THIS EFFORT.

FURTHER MECHANICAL DESIGN IS TEMPORARILY HALTED PENDING A MORE DEFINITE INDICATION THAT AN OPTICAL SOLUTION CAN BE ACHIEVED.

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[Redacted]

Registered Mail

December 4, 1957

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Reference: Contract RD-113, Task III

Subject: Progress Report

Gentlemen:

During the past four weeks all our efforts have been concentrated in the design of the shutter control mechanism and its' adaptation to the existing shutter mechanism.

The following tasks are completed as of this date:

1. Electronic circuitry has been engineered and a working bread-board has been constructed.
2. The existing shutter design has been modified. All of the parts requiring rework have been modified and most of the new parts required have been fabricated.
3. The automatic shutter control mechanism has been completely designed and detailed, and approximately half of these parts are in fabrication.
4. Some difficulties have been encountered in the placement of the photo-electric cells between the lens and the shutter because of extremely tight space limitations. A satisfactory solution has been worked out. Further effort is now being directed towards the incorporation of a capping shade in front of the cells in order to make the system a closed loop type.

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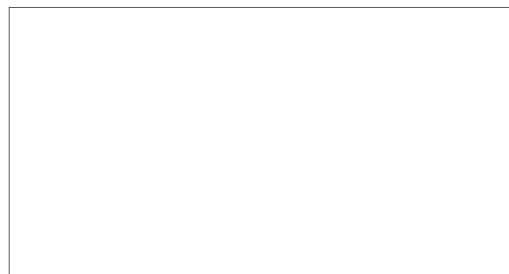
Page 2

December 4, 1957

From the standpoint of the shutter control only, percentage completion at this stage is estimated at 60%.

Since all the magazines and the remainder of the camera proper are complete, the entire system is estimated as being 93% complete.

Sincerely yours,



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February 8, 1957

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Reference: Contract RD-113

Subject: Status Report

Gentlemen:

Of the original four tasks specified in the above contract, tasks II, III, & IV remain in the category of unfinished business. The problems which have been encountered have been clearly delineated to the cognizant project engineer. This report is intended to provide a firm and realistic analysis of the work remaining. This is now possible principally due to the fact that the many uncertain elements in development work have finally been overcome.

Task II -

Rather substantial problems were encountered in the electronic design of the photo cell mechanism. As a result our previous estimate is somewhat shy in funds as well as time. We feel that the justification for additional funds may be substantiated by virtue of the fact that the developed system now thoroughly tested provides, we believe, an advance in the current state of the art in terms of this application. Delivery of the items will be made by March 15, 1957. In terms of total costs an extension of funds for \$3200.00 is respectfully requested. *Drawings & Instructions -*

Task III -

C-1116

All discussion related to the procurement of the lenses involved have now been clarified and procurement for these will proceed immediately. Fabrication of parts is still in process with major castings expected to be released by early March. Present funding appears sufficient for the task and a firm delivery is intended for not later than June 1957.

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Page 2

February 8, 1957

Task IV -

Just two weeks ago a meeting was held to determine the acceptability of a change of course as related to the original specifications. The acceptance given at that time has now reactivated this procurement along the lines agreed upon. Notwithstanding the change, we feel certain that delivery of the three items and other associated parts will be effected by May 1957. Our present estimates of costs are currently within the funds allocated.

I should like to apologize quite sincerely for failure to comply with reasonable notice as to scheduled delay, and in the one instance extension of funds has been found to be necessary. I want only to assure you that these oversights will be avoided in the future

Respectfully submitted

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HRG:aw

Copy sent to R&D
Branch. P.D. re J.C. II
Request for trans. needed
for J.C. IV
also III
Action being taken.

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December 17, 1956

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Reference: Contract #RD-113, Task III, Task IV

Subject: Status Report

Gentlemen:

1. Task III -

The design portion of this task is now 85% complete. As such all pertinent mechanism has been defined and breadboard models of the mechanisms built to confirm their operational use in accordance with specifications.

Construction of final equipment has been started, and approximately 60% of the standard purchase parts are on order, with no delivery problems anticipated. The lens family for this unit is now in the process of selection and should be on order by this month's end.

The essentially "noiseless" aspect of this camera has created some rather substantial problems which have in time been overcome. The present schedules anticipate a task completion by March 6, 1957.

2. Task IV -

The design aspect of this task is proceeding in close accord to schedules. Basic mechanisms have been defined and are now in the packaging phase in an attempt to present the smallest possible configuration. A few lenses have been evaluated for use with this camera. It appears that the smallest of these may yet require a smaller barrel than may be procured commercially. This, however, presents no problem.

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Page 2

December 17, 1956

This task is approximately 30 days from the start of fabrication,
and the original contract delivery of March 15, 1957 appears firm.

Respectfully submitted,

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HRG:aw

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